

A blurred photograph of an office interior. The scene is dominated by a large window with a grid pattern, through which bright light is streaming, creating a warm, yellowish glow. Several people are visible as dark silhouettes moving across the frame, suggesting a busy work environment. The ceiling has a grid of lights and some pinkish-purple structural elements.

Our Story

Named after the clever groundhog that inhabits the Eastern USA and Canada that can predict changes in seasons (time) and is a master tunnel builder (space), Groundhog Technologies is a spin-off from Massachusetts Institute of Technology (MIT). We invented mathematical modeling technologies that calculate subscribers' mobility and usage behavior as the basis for analyzing network bottlenecks and providing what-if analysis for different network design scenarios. With some of the world's best scientists, since 2001 we have been helping leading operators such as AT&T, Vodafone KK, KDDI, China Mobile and T-Mobile to solve various network challenges they have encountered.

Groundhog Technologies provides network resource engineering. We help operators reduce the risk, time, and effort of SGSN/ RNC/ MGW/ MSC/ BSC planning optimization, and expansion.

We also support operators to deal with inter-RAT and upcoming challenges with advanced technologies such as geocoding to indoor resolution. The solutions allow operators to easily and effectively manage heterogeneous networks.

*Empower your network with
mobility intelligence*

Upcoming Network Challenges

Network design and optimization based on subscribers' mobility and traffic dynamics is becoming even more crucial in multi-vendor, multi-generation networks. Packet-switched traffic patterns vary greatly from voice traffic patterns, with inter-RAT (Radio Access Technology e.g. inter-2G/ 3G) mobility causing an excessive amount of previously unforeseen signaling.

Packet Switched Data Challenges

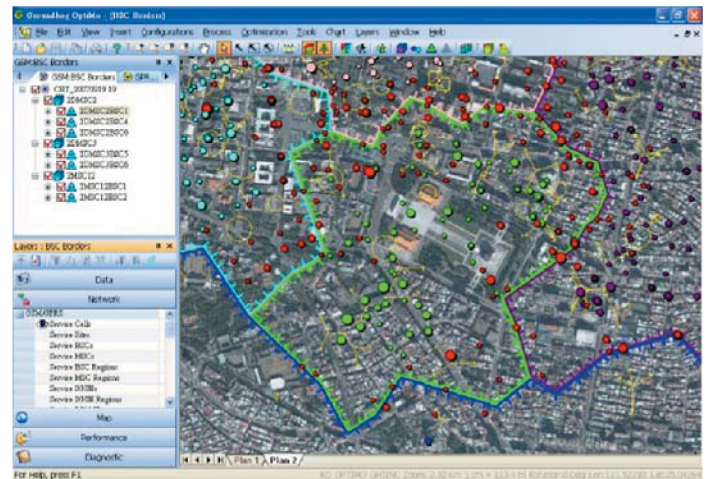
Unlike traditional voice calls which have much longer holding times, data transmissions are bursty in nature and incur much more mobility management loading. Several leading 3G operators experienced large-scale network outages from unexpected traffic patterns. Often, more than 50% of CPU loading in these networks is caused by signaling instead of traffic. Such effects cannot be predicted by the traditional Erlang, throughput-based traffic models or rule-of-thumb dimensioning and are often neglected until it is too late.

Groundhog Technologies' advanced mobility modeling and traffic modeling makes these effects predictable, reduces risks, and eliminates the time and effort of trial-and-error methods.

Inter-RAT Challenges

In a network where 3G coverage is not as complete as 2G, 3G users bounce back and forth between 2G and 3G, causing high signaling loading on both 2G and 3G networks. Many of our customers have realized that more than 50% of their RRC resources are being consumed by such activities. The result is faster than expected network loading growth leaving no time for trial-and-error optimization methods to create a relief plan; not to mention the inaccuracy of traffic models that lead to erroneous predictions.

Groundhog Technologies' inter-RAT mathematical modeling expertise has helped these operators to discover 3G coverage holes automatically and simultaneously, minimize their inter-RAT loading and failure, balance 2G and 3G loading, and reduce the risk of network outages from unnecessary signaling. It is also a key technology for Shared RAN planning and optimization.



Indoor Issues are Significant

Nowadays typically 60%~80% customer complaints are for indoor issues, and most data usage happens indoors. The increase of data usage is also causing cell breathing and thus coverage holes varying in times. Advanced operators are planning their high speed packet-switched networks starting with indoor coverage. In support of this strategy, Groundhog Technologies has utilized Chaos Theory to successfully perform geocoding to indoor resolution, in order to identify user-perceived network issues such as coverage holes and data throughput with very high resolution and accuracy.

Our Solution Suite

Groundhog Technologies provides operators with solutions from three main product lines - network optimization (**OptiMo™**), capacity planning (**CapMo™**), and geocoding to indoor resolution (**CovMo™**). The systems are based on patented technologies that evolved from spatial-temporal mathematical modeling, chaos theory, and artificial intelligence.



Features

- MSC/ MSS/ MGW/ SGSN/ RNC/ BSC optimization based on subscribers' mobility and usage behavior.
- What-if analysis for expanding and optimizing networks.
- Simultaneous 2G and 3G planning and optimization with Inter-RAT mobility and traffic impact consideration.
- Automatic 3G Coverage Hole Detection based on multidimensional data analysis, largely saving the time and effort for drive test.

Benefits

- Eliminates trial-and-error network planning/ expansion and the associated time, resources and risk.
- Minimizes network risks by deploying the right resource at the right time and place.
- Maximizes revenue via better network quality.
- Reduces the complexity of expanding and optimizing 2G and 3G co-existing networks.



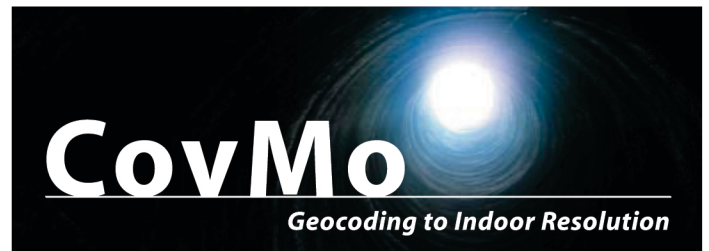
Features

- Forecasts when, where, and what network elements to expand, at both a macro and a micro level.
- Automates capacity planning with scientific methodology customized for your internal procedures.

- System alerts to monitor network capacity status with defined trigger rules based on actual network data and operator marketing forecast.

Benefits

- Reduces risk by knowing when and where additional capacity will be required and creating effective expansion plans with enough lead time.
- Reduces operational effort for capacity and capital planning.
- Utilizes network investments effectively.



Features

- Utilizing Chaos Theory and multi-dimensional analysis to achieve unprecedented indoor resolution and accuracy (typically > 90%) of pinpointing coverage holes and KPIs.
- Linking network issues with Subscriber-Based Intelligence™ to understand the user perspectives.
- Enabling platform with extension modules for revealing user-perceived data throughput, spatial and temporal KPI analysis, additional capacity investment analysis, proactive churn analysis, persuasive call center, and Femtocell strategy.

Benefits

- Identifying indoor issues which were unpractical to find by conventional approaches.
- Improving Quality of Service by speeding up the deployment of suitable solutions. effectively integrated into seamless operation.
- Reducing the cost of new cell deployment. Operators know with surgically precision where to place new equipment and services.

Some of Our Results

Groundhog Technologies has a long history of helping operators around the globe. We have effectively improved network quality in circumstances that include large subscriber increases, great volume increases in packet traffic, network integrations, and special events that lead to traffic surge.

Vodafone K.K. (the first UMTS network in Vodafone group) achieved a reduction of up to 90% of their paging congestion after optimizing with our Mobility-Based Optimization technology. China Mobile (the largest operator in the world) in Ningbo, recouped 2% of lost revenue after implementing our solution. One of the largest European operators had a network overload issue in the same area for 3 consecutive years and during certain periods of time; our solution helped find the root cause and they have avoided outages since the solution implementation.



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